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(54) Touch zoom in/out for a graphics display

(57) A method of zooming in/out for a graphics image on a display screen encompasses drawing a rectangle on the display screen, either entirely within a display area of the display screen for two-dimensional zoom in/out or along one axis within a peripheral area of the display screen for one-dimensional zoom in/out. Once the rectangle is drawn by dragging from one corner to an opposite corner, tapping or clicking within the rectangle causes a zoom in action and tapping or clicking outside the rectangle causes a zoom out action.

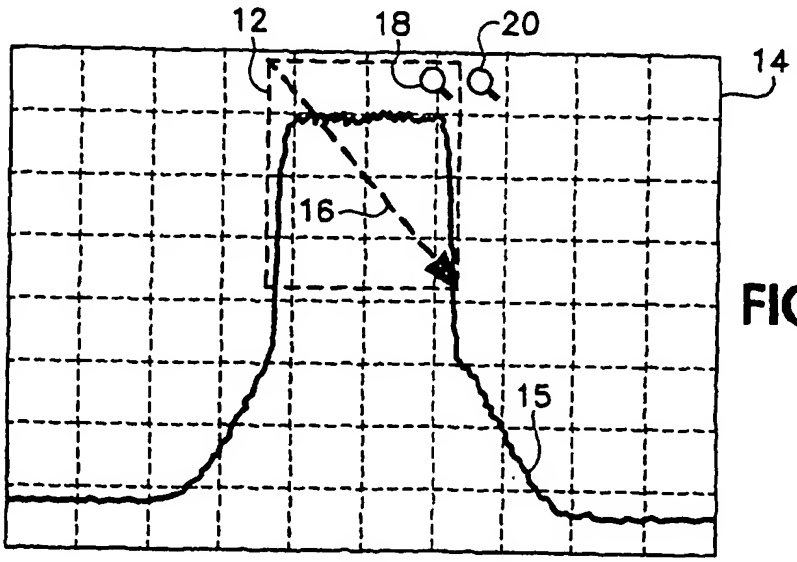

FIG.1

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to touch screen interfaces, and more particularly to a method of zooming in/out for a graphics display.

[0002] A quick and intuitive method for zooming in on a user-defined section of a graphics display is to simply indicate a rectangle with a mouse or touch on a graphics display screen by dragging one corner to an opposite corner. The area within the rectangle is then expanded in two dimensions to fill the entire display upon a user action, such as lifting the mouse cursor or touch, clicking a zoom button or clicking within the rectangle. The issue of how to perform the opposite action — zooming out — has not been well addressed to date. Another weakness of the present method is that a one-dimension-only zoom is somewhat awkward in that the operator has to think carefully about the problem, then draw the rectangle to completely span the axis that he **doesn't** want to affect.

[0003] What is desired is a quick and intuitive method for zooming out as well as zooming in including an easy way for performing one-dimension-only zooming.

BRIEF SUMMARY OF THE INVENTION

[0004] Accordingly the present invention provides a method of zooming either in or out by drawing a rectangle on a graphics display, using either touch or a mouse. A pair of icons are presented, one within the rectangle and the other outside the rectangle. Clicking or touching within the rectangle results in zooming in so that what is inside the rectangle fills the entire display, and clicking or touching outside the rectangle results in zooming out so that the entire display is compressed to within the rectangle with additional previously unseen portions of the image fill the remainder of the screen. For one-dimensional-only zooming the rectangle is drawn along an axis in a peripheral area of the display, and the rectangle completely encompasses the other axis.

[0005] The objects, advantages and other novel features of the present invention are apparent from the following detailed description when read in conjunction with the appended claims and attached drawing.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0006]

Fig. 1 is a plan view of a graphic screen display for drawing a rectangle according to the present invention.

Fig. 2 is a plan view of a graphic screen display showing zoom in for the rectangle of Fig. 1.

Fig. 3 is a plan view of a graphic screen display for drawing a rectangle on the display of Fig. 2.

Fig. 4 is a plan view of a graphic screen display showing zoom out for the rectangle of Fig. 3.

Fig. 5 is a plan view of a graphic screen display for drawing a rectangle for one-dimension-only zoom in/out according to the present invention.

Fig. 6 is a flow chart view of the zoom in/out method according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0007] Referring now to Figs. 1 and 6 for a two-dimensional zoom in/out a user describes a rectangle **12** on a graphics display screen **14** having an image **15** by dragging a mouse cursor or touch pointer from one corner to an opposite corner of a portion of the display as illustrated by an arrow **16**. As is well known, the arrow **16** does not have to actually be displayed on the screen **14**, and generally isn't, but is shown here to illustrate the path of the pointer. The user touches the screen **14** at the upper left end of the arrow **16** and drags to the lower right tip of the arrow, then lifts the touch pointer or mouse button. As the user drags along the screen **14**, the zoom rectangle **12**, shown with dashed lines, grows to follow the progress of the pointer/cursor. Upon completion of the drag operation two symbols **18, 20** appear superimposed on the graphics display screen b to provide a hint about what to do next. One symbol **18** is inside the rectangle **12** and the other **20** is outside. The inside symbol **18** indicates Zoom In and the outside symbol **20** indicates Zoom Out. Clicking or touching anywhere within the rectangle **12** causes the Zoom In action to expand the rectangle's contents to fill the graphics display screen **14**, as shown in Fig. 2. The new display is scaled to shown the contents of the zoom rectangle **12** increased in size both horizontally and vertically to fill the original display area.

[0008] Clicking outside the zoom rectangle **12** causes the Zoom Out action to shrink the graphics image **15** such that the graphics image that previously covered the entire area now is scaled to fit within the rectangle, as shown in Fig. 4 with respect to Fig. 3. The area outside the rectangle **12** now contains the portion of the graphics image **15** that was previously outside the graphics viewing area.

[0009] One-dimensional zoom in/out is accomplished by dragging the rectangle **12** in an axis area **19** adjacent the graphics image **15**, as shown in Figs. 5 and 6. For example, dragging across a portion of the horizontal axis **19** creates the rectangle **12** that spans the entire vertical range of the graphic image **15**, but only the portion of the horizontal range which the user wishes to target for zoom in/out. Likewise dragging across a portion of the vertical axis **19** creates a zoom rectangle **12** that spans the entire horizontal range, but only the portion of the vertical range which the user wishes to target for zoom in/out. Upon touching within the zoom rectangle **12** the image **15** is expanded in one direction only to

either fill the entire display area (Zoom In) or to compress the current image to be within the zoom rectangle (Zoom Out) displaying portions of the image that previously were outside the display area.

[0010] Additionally an Undo button may be displayed, either within the display area or adjacent to it. When the user presses the Undo button, the last display scaling action, such as those described above, is reversed, returning the display to the state it was in before the scaling action was initiated. The Undo button then changes into a Redo button. Pressing the Redo button repeats the scaling action that was undone by the Undo button, and the Redo button becomes the Undo button again. By pressing this button multiple times, the user may switch back and forth between two displays of different scale factors, either horizontal, vertical or both.

[0011] Thus the present invention provides a method of zooming in/out using a rectangle drawn on a graphics display screen, providing indicators of Zoom In and Zoom Out inside and outside the rectangle respectively, and performing the scaling function indicated by where the user taps or clicks — inside or outside the rectangle.

Claims

1. A method of zooming in/out for a graphics image on a display screen having a display area and a peripheral area comprising the steps of:

   drawing a rectangle on the display screen from a first corner to a second corner to indicate an area to be zoomed in/out; and
   contacting the screen either inside or outside the rectangle, contact within the rectangle initiating a zoom in action so that the portion of the graphics image within the rectangle is expanded to fill the display area and contact outside the rectangle initiating a zoom out action so that the graphics image within the display area is compressed to fit within the rectangle and portions of the graphics image formerly outside the display area are now within the display area.

2. The method as recited in claim 1 further comprising the steps of:

   providing a redo/undo button on the display screen; and
   contacting the redo/undo button to reverse the zoom in/out action, the function of the redo/undo button changing between redo and undo for every contact.

3. The method as recited in claim 1 wherein the rectangle is drawn entirely within the display area of the display screen for two-dimensional zoom in/out.

4. The method as recited in claim 1 wherein the rectangle is drawn within the peripheral area of the display screen along one axis of the graphics image for one-dimensional zoom in/out.

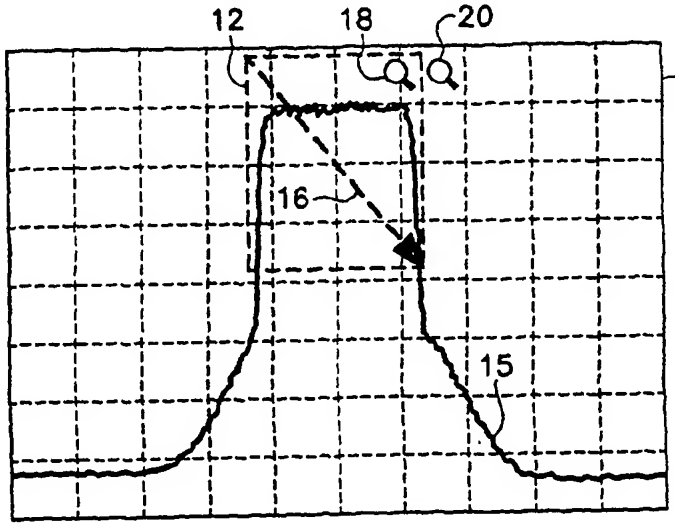

FIG.1

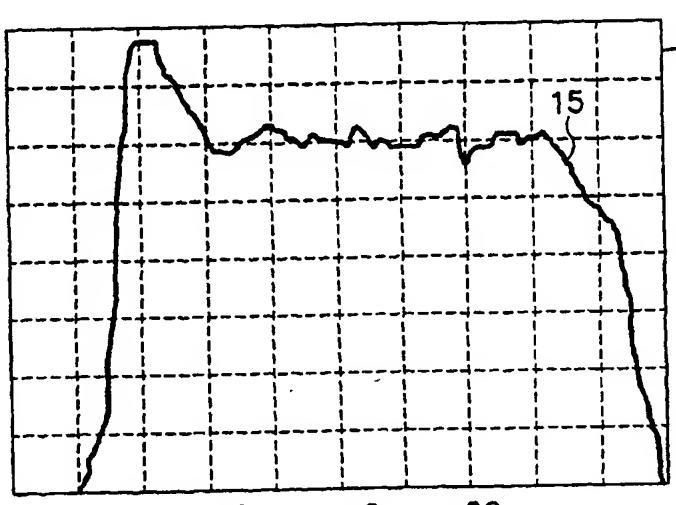

FIG.2

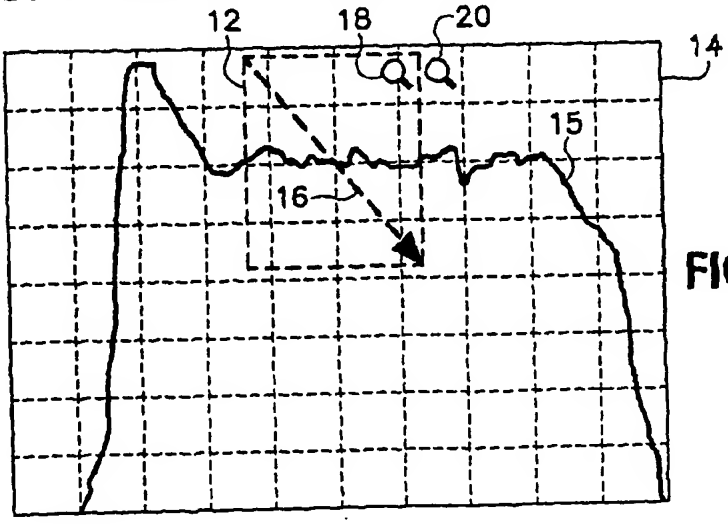

FIG.3

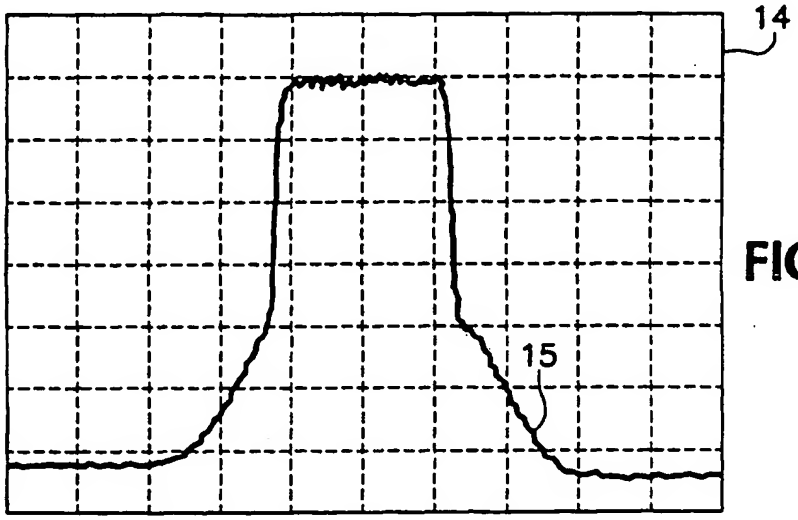
14
15

FIG.4

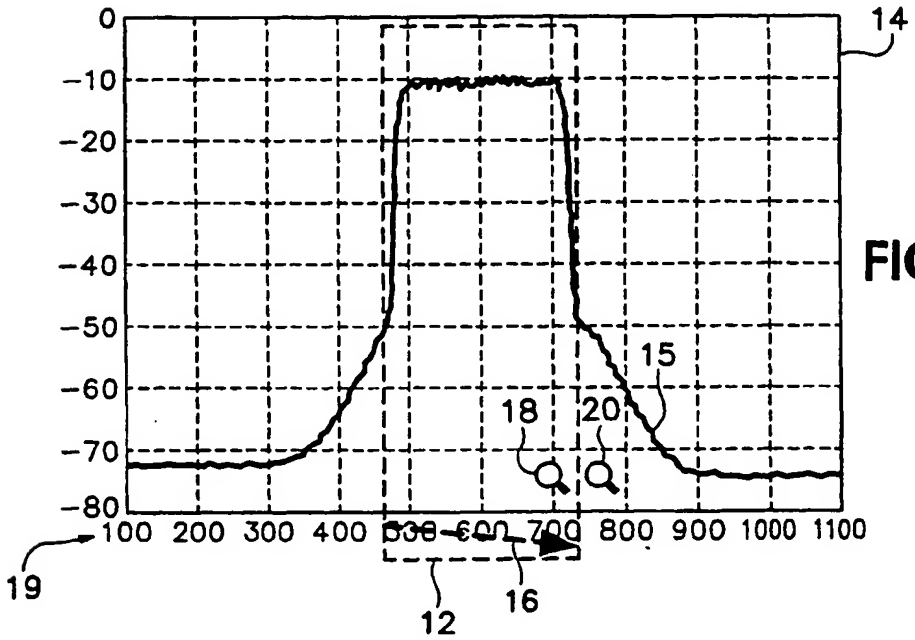
0
-10
-20
-30
-40
-50
-60
-70
-80
100 200 300 400 500 600 700 800 900 1000 1100
14
15
18
20
19
12
16

FIG.5

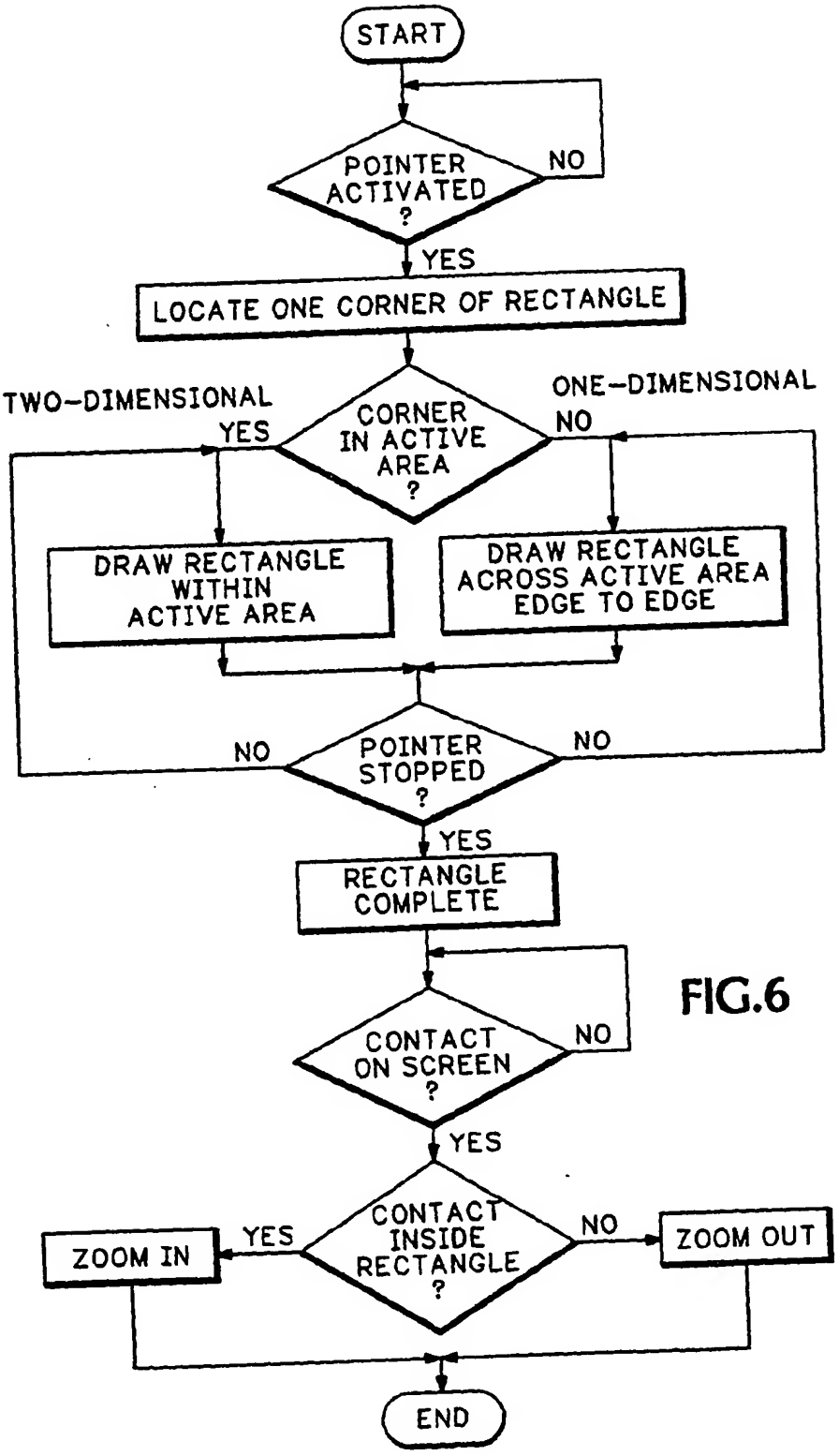
START
POINTER ACTIVATED ?
NO
YES
LOCATE ONE CORNER OF RECTANGLE
TWO-DIMENSIONAL
YES
CORNER IN ACTIVE AREA ?
ONE-DIMENSIONAL
NO
DRAW RECTANGLE WITHIN ACTIVE AREA
DRAW RECTANGLE ACROSS ACTIVE AREA EDGE TO EDGE
NO
POINTER STOPPED ?
NO
YES
RECTANGLE COMPLETE
CONTACT ON SCREEN ?
NO
YES
CONTACT INSIDE RECTANGLE ?
YES
ZOOM IN
NO
ZOOM OUT
END

FIG.6

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  Milton-Freewater, Oregon 97862 (US)

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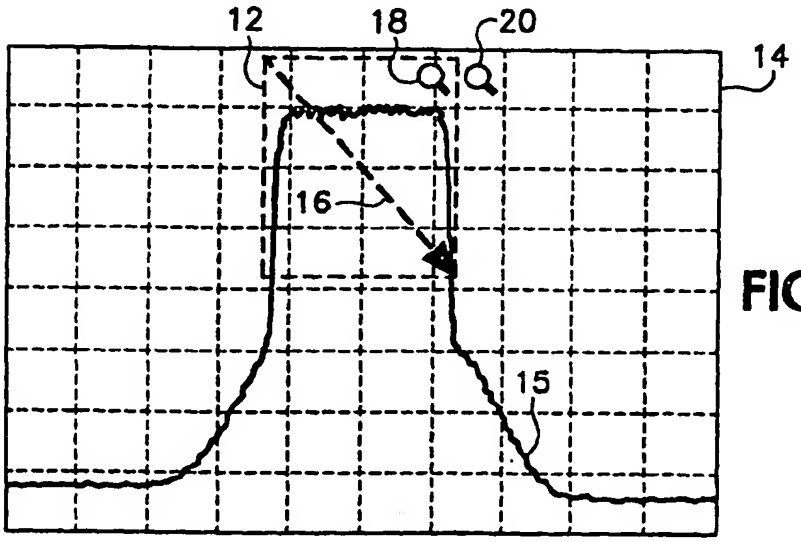

FIG.1

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EUROPEAN SEARCH REPORT

Application Number
EP 01 30 6680

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 0 883 055 A (SONY CORP) 9 December 1998 (1998-12-09) * page 4, column 2, line 11 - page 4, column 2, line 54; figures 4-6 * ---	1-3	G06F3/033
A	D. RAGGETT ET AL.: "HTML 4.0 Specification" 24 April 1998 (1998-04-24) , W3C , HTTP://WWW.W3.ORG/TR/1998/REC-HTML40-19980424/HTML40.PDF XP002258129 * page 1 * * page 162 - page 163 * ---	1	
A	EP 0 693 852 A (EASTMAN KODAK CO) 24 January 1996 (1996-01-24) * page 3, column 1, line 57 - page 3, column 1, line 59 * ---	2	
A	THOMAS A ALMY ET AL: "User interface for zooming of graphic displays" , RESEARCH DISCLOSURE, KENNETH MASON PUBLICATIONS, HAMPSHIRE, GB, VOL. 312, NR. 46 XP007114985 ISSN: 0374-4353 * the whole document * ---	1,3	
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)
G06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	20 February 2004	Mouton, B

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 30 6680

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 01, 30 January 1998 (1998-01-30) -& JP 09 245188 A (FUJITSU LTD;FUJITSU VLSI LTD), 19 September 1997 (1997-09-19) * abstract * & US 2002/015054 A1 7 February 2002 (2002-02-07) ---	4	
A	US 6 064 401 A (HUNTER WESLEY G ET AL) 16 May 2000 (2000-05-16) * column 4, line 27 - line 51; figure 2 * -----	4	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)

The present search report has been drawn up for all claims

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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

European Patent Office

Application Number
EP 01 30 6680

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

European Patent Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 01 30 6680

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-3

A method for zooming in or out for a graphics image by drawing a rectangle and initiating a zoom in or out action by contacting the screen respectively inside or outside the rectangle,

characterised in that an undo/redo button is provided on the display screen.

2. Claim : 4

A method for zooming in or out for a graphics image by drawing a rectangle and initiating a zoom in or out action by contacting the screen respectively inside or outside the rectangle,

characterised in that the rectangle is drawn within the peripheral area of the display screen along one axis for one-dimensional zoom in or out.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 01 30 6680

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on 20-02-2004
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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